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DESERT AWARENESS

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drawings by Virginia Schoeffler
photography by Terry Hickson and Carl Rice

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UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SACRAMENTO, CALIFORNIA

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This booklet is about the California desert, written for desert users by desert users. Our hope is that by increasing awareness of the complexity of the desert environment, we will learn to use the deserts in a way that leaves them healthy and intact for future generations.

Through interpretation, understanding.
Through understanding, appreciation.
Through appreciation, protection.

THE DESERT: A HISTORICAL PERSPECTIVE

The desert holds a wealth of history for the observant visitor. Various Indian groups lived in the deserts of California thousands of years before European settlers came. You may ponder their presence on your desert explorations. (Calico, near Barstow, has a guided interpretive program.)

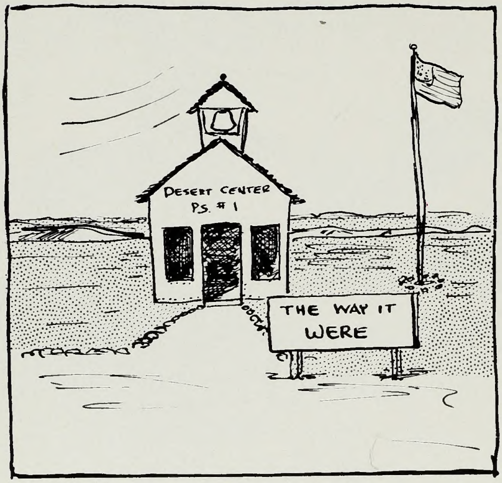
American history teaches us that gold was first discovered at Sutter's Mill near Sacramento, but desert miners were extracting gold from the Chocolate Mountains long before the forty-niners caught gold fever.

In the small town of Eagle Mountain stories about people's lives on the desert abound. The old three-level Granite gold mine was carved out of the Chuckwalla Mountains near Desert Center in 1890-1900. It never really paid for itself in golddust but its vast, hollow tunnels still echo with the whispers of the quiet existence of hardworking men. In 1927 Henry K. Hennigh came to live in the wooden cabin at the base of the mountain. It's said he came because of lung problems, and to be a caretaker.

I remember him as a gentle old man with sparkling eyes who pulled splinters out of my leg when I was very small and not so wise in desert ways. Henry climbed the steep trail and worked in the mine using simple hand tools. We had to hurry to keep up with his quick, sure-footed pace. He was amazing!

Granite Gold Mine

If you listen carefully to the desert wind or the hollow echo in a mine, you may still feel the presence of Henry and all those who passed their lives on the desert, alone and peaceful.

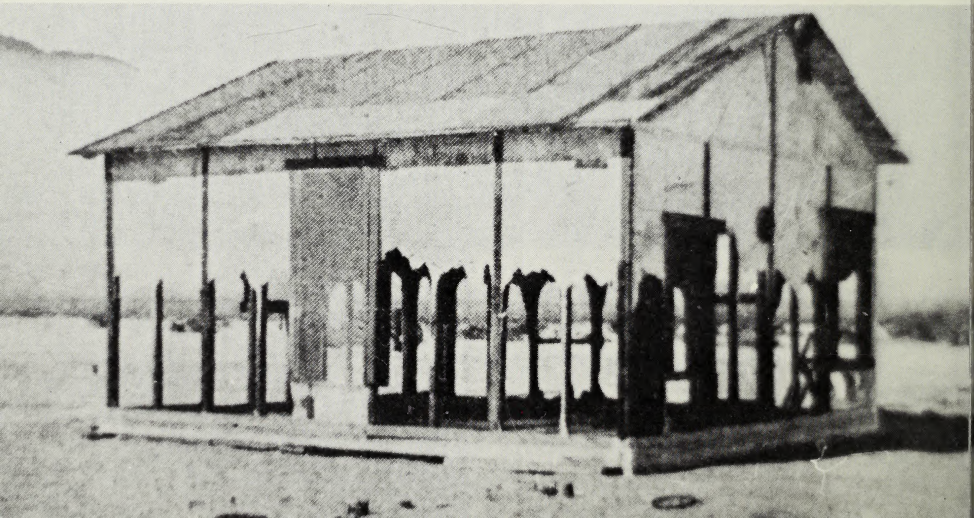


There weren't enough local children to justify a teacher so Dad ran an ad in a Los Angeles paper for a mechanic for his service station. Qualification: large family! The mechanic who got the job had 8 children. So we got a teacher. The townsfolk had to furnish the building. It was a small cardboard shack which worked fine for awhile. Until the rains, that is.

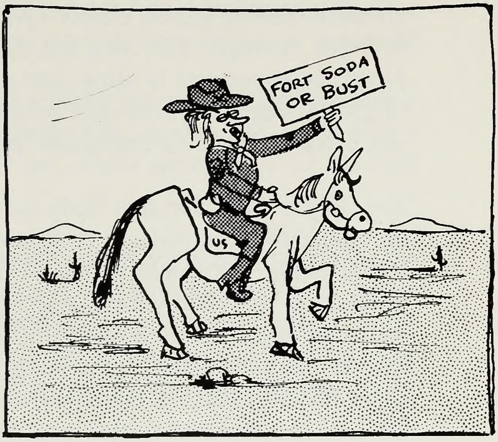
The booming metropolis called Desert Center was founded in the California desert as a wayside stop on what is now Interstate Highway 10 by Steve Ragsdale, who brought his family there in 1915. Above, Steve's son, Stanley, tells about the problems of schooling in the isolated area.

I can still hear Stanley laughing at the picture of that soggy school shack being eaten by his father's goats.

Desert Center schoolhouse after being eaten by goats



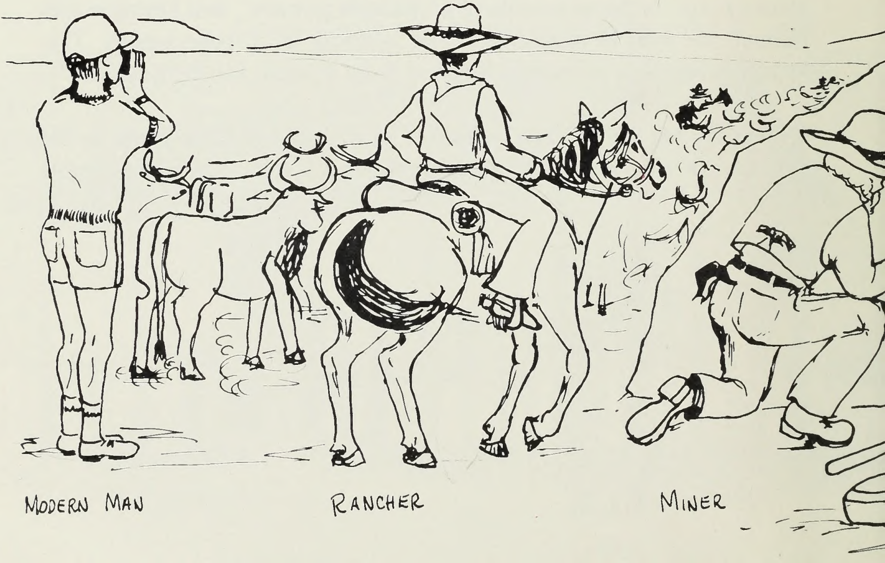
And then there's the story of Soda Springs. During the days of early settlement, this spring was a regular watering stop for travelers between Barstow and the Colorado River. Early travelers followed Mojave Indian trails. As the number of travelers using the route increased, Indians began to raid the groups. To protect travelers the cavalry built Fort Soda at the springs. Next came the railroad, following much the same path as the old road.



The final bit of history surrounding Fort Soda began in the 1930's when Curtis Howe Springer filed mining claims at the spring. He proceeded to build a small community, ''a resort of sorts'' built by a conglomerant of people collected together by Springer. Little, if any, mining took place except for the extraction of a ''miracle powder'' that Springer sold through the mail to people who had ailments of all descriptions. This lucrative business supported the Fort Soda venture for many years.

Eventually the clandestine activities of this desert oasis came to the attention of the Bureau of Land Management, the agency responsible for administering mining claims. Over 20 years after the initial action to evict Mr. Springer, Fort Soda was finally returned to BLM jurisdiction. Now this unique area is being used as a desert research site for a group of professionals affiliated with several California colleges. Quite a social evolution for a remote desert spring!

The story of Soda Spring is fairly typical of land use in the desert. It has proceeded for years without thought of any overall plan. In the 1800's, to encourage settlement of the west, the U.S. government began a program to subsidize the building of railroads. When a railroad track was built every alternate section of land for 10 miles on either side of the railroad was given to the builders. This resulted in the complex checkerboard pattern of land ownership that exists today. In the 1950's the U.S. government carried out the Small Tract Program by which individuals were deeded small tracts of land to encourage public use of desert lands. This resulted in the numerous small houses that cover large areas of the desert. By the 1960's it became apparent that the public wanted the desert maintained in federal ownership and managed for public use. By the early 1970's management programs were being established to assure wise use of the deserts. In 1976 with the passage of



the Federal Land Policy and Management Act, sometimes called the BLM Organic Act, management of the California deserts is mandated

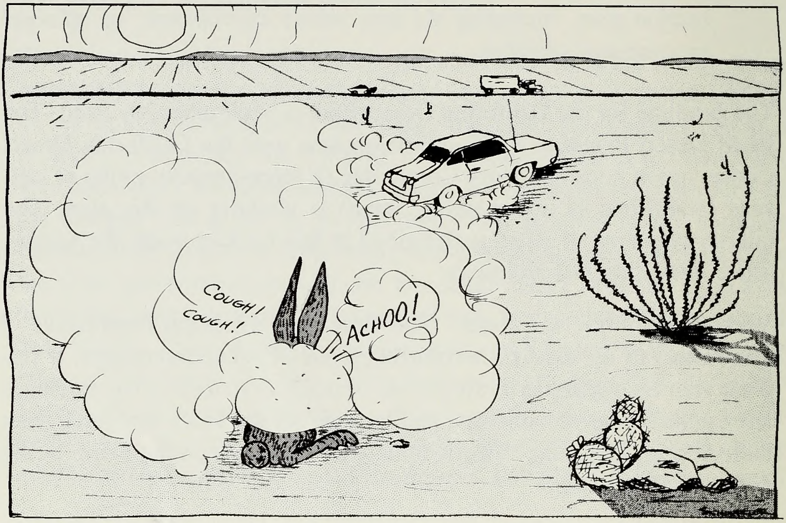
> *to conserve these resources for future generations, and to provide present and future use and enjoyment, particularly outdoor recreation uses, including the use, where appropriate, of off-road recreational vehicles.*

The deadline for the California Desert Plan is September 30, 1980. The BLM Desert Planning Staff, in conjunction with the California Desert Conservation Area Advisory Committee (a representative group of citizens established to insure public input) is working on this plan. The interim plan now in effect is described in this booklet under the section titled: Traveling Off-Highway.

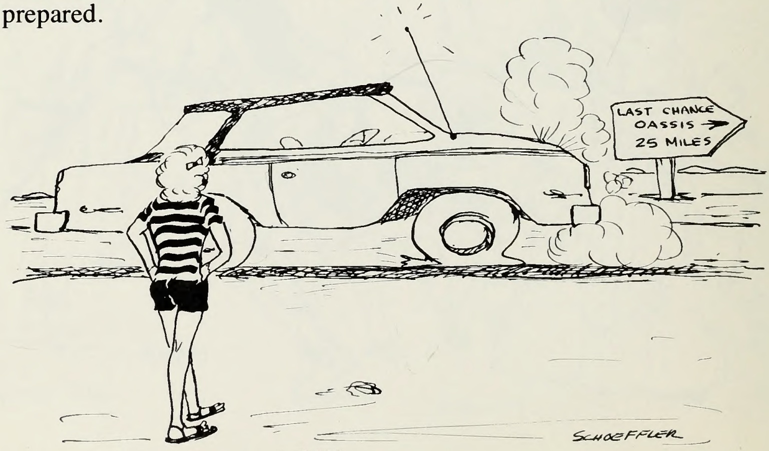
What does all this say about ''The Desert: A Historical Perspective''? The history of the desert is a colorful parade of American people. If you want your own glimpse of the parade, remember to look at the messages left by the former inhabitants, and to seek out the folks who have been there a long, long time. Take a minute to look through their eyes at the desert and its history.

VISITING THE DESERT

The most common means of visiting the desert is by automobile and the two basic types of automobile visitation are on-road and off-road. On-road means that you stay on established paved roads. Desert treks become off-road adventures when travelers leave established paved roads and strike out on dirt roads that are generally more remote and less traveled.


COUGH!
COUGH!
ACHOO!

Whenever traveling on the desert you're likely to see very few service areas for either you or your car. BE PREPARED! Keep your gas tank full. Carry extra gas, water, oil, transmission and brake fluid, and tools. It's a good idea to carry two spare tires, especially for off-road travel. Remember, it's a long walk to the Last Chance Oasis; better to come prepared.

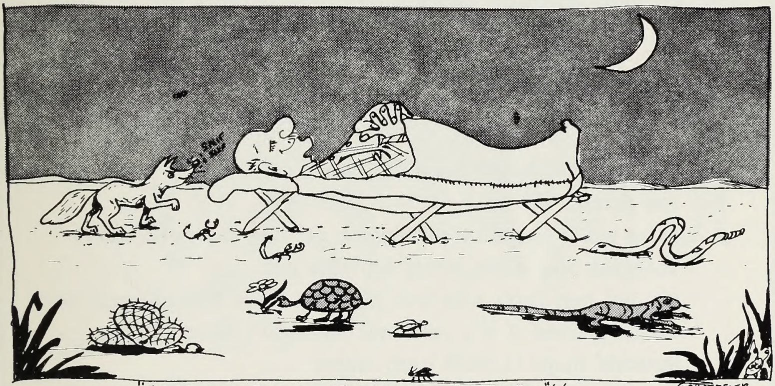


DESERT CAMPING

Have you ever watched lizards on sand or boulders, smelled creosote in the quiet of early morning, marveled at a short-lived carpet of white, yellow, or purple flowers, or spent the night where it's so quiet you can hear the stars twinkle? If so, you already know some of the pleasures of camping in the desert.

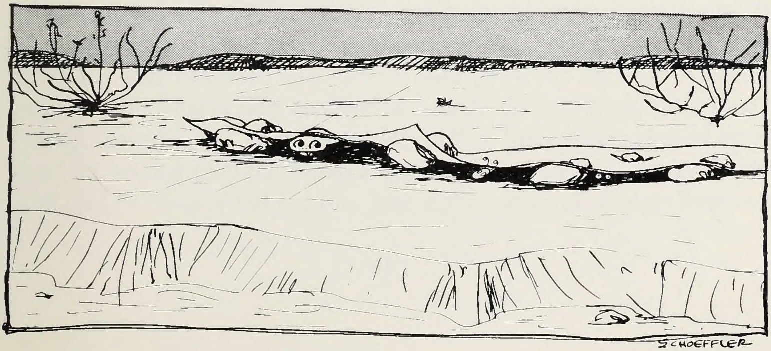
Here are some practical tips to help increase your enjoyment of the camping experience.

1. If you are sleeping outdoors, use a cot. This will take care of the problem of snakes, scorpions, or various other desert creatures trying to move in as bedfellows. But the major reason for using a cot is to help you sleep peacefully and securely, without imagining that every creature in the desert is trying to invade your territory.



"SAFE AND SOUND - UP OFF THE GROUND"!!

If you don't have a cot, an old camper's trick that may help is to put down a blanket or groundcloth and put rocks underneath the edges so creatures at least go under your bed instead of crawling right in. If it's windy you can put rocks on top of your groundcloth to hold it down like this:



2. Don't set up your camp in a wash! Those rumored flash floods are a reality. Even though there may not be any rain where you are, a cloudburst nearby on higher ground may have its drainage pattern right through your campsite.

3. Bacteria grow quickly in the warm desert climate. Be especially careful with perishable foods.

4. Put food away after you eat. Lots of hungry little critters are waiting for open boxes, picnic baskets, and ice chests.

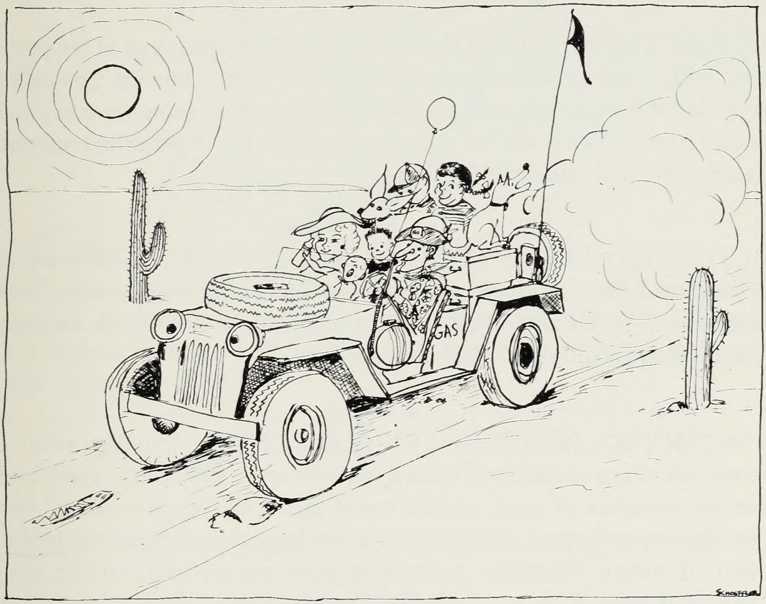
5. All animals, whether poisonous or not, should be respected. In the desert, you're visiting the homes of many animals. Respect their boundaries. Enjoy them from a distance. And remember, whatever you do on the desert, you're making changes. Ask yourself how your changes affect the other parts of the desert's life system?

List of things you might need for desert camping:

- sun screen
- extra water (1 gallon per person per day is a good safety margin); also extra water for your car
- ground pad (you will lose all your body heat through the air or ground if it's cold and you don't have a pad)
- detailed maps (USGS topo maps)
- litter bag (leave an area cleaner than you find it)
- shovel
- a sense of adventure, moderated with caution.

TRAVELING OFF-ROAD

Off-roading in the desert can mean either traveling on established dirt roads or cross-country where no trails exist. It is an excellent way to see the desert at close range, to slow down and notice desert detail.



Historically there were no controls or management policies regarding off-road use. In the 1960's user impact began to grow dramatically. By 1964 when widespread public involvement was sought under the Classification and Multiple Use Act, it was apparent that the American people wanted the deserts retained in Federal ownership and managed to benefit desert users. In 1973 the Bureau of Land Management developed an interim plan for management of all recreational vehicles. This plan will be revised and become part of the California Desert Plan to be completed by 1970. The current plan divides the public lands into the following use designations: (see map on pages 14 and 15)

CLOSED: Vehicle travel is prohibited. Access by means other than motorized vehicle is permitted. (Red Area)

OPEN: Vehicle is permitted anywhere in the area if the vehicle is operated responsibly in accordance with regulations. (Green Area)

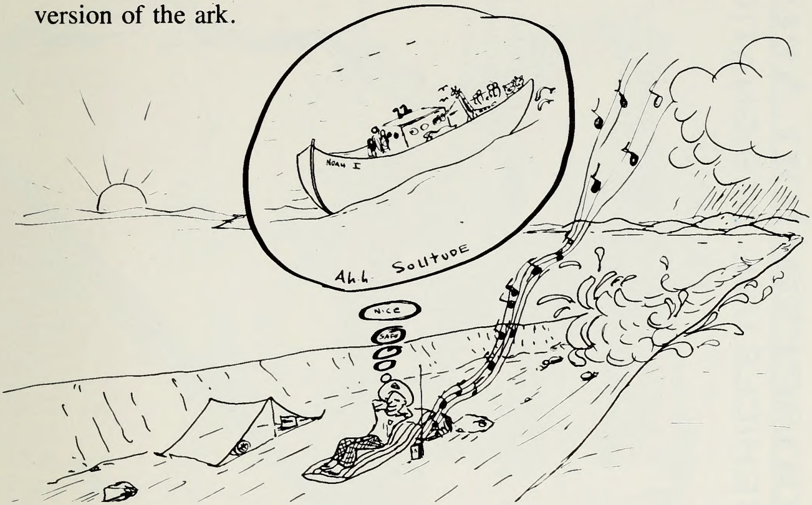
RESTRICTED: SPECIAL DESIGN: Plans will be prepared in cooperation with other governmental agencies and public interest groups to provide for vehicle use and related facilities such as camping areas and access roads. Until plans are completed vehicle use is permitted only on existing vehicle routes. (Blue Area)

RESTRICTED: DESIGNATED ROADS AND TRAILS: Vehicle travel is permitted only on roads and trails designated by the Bureau. Until designation is accomplished, vehicular travel is limited to existing routes as defined below. (Orange Area)

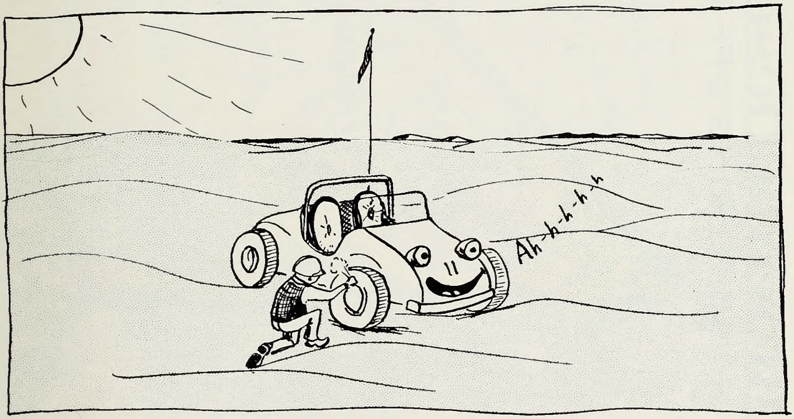
RESTRICTED: EXISTING VEHICLE ROUTES: Existing vehicle routes are those established before November 1, 1980 with significant surface evidence of prior vehicle travel and a minimum width of two feet (for motorcycles). Widening or extending of these routes is prohibited. If nature eliminates portions it does not exclude vehicle use. (Yellow Area)

More information on this program as well as excellent desert maps showing use designations are available on request from the BLM District Office in Riverside, address listed in the back of this booklet.

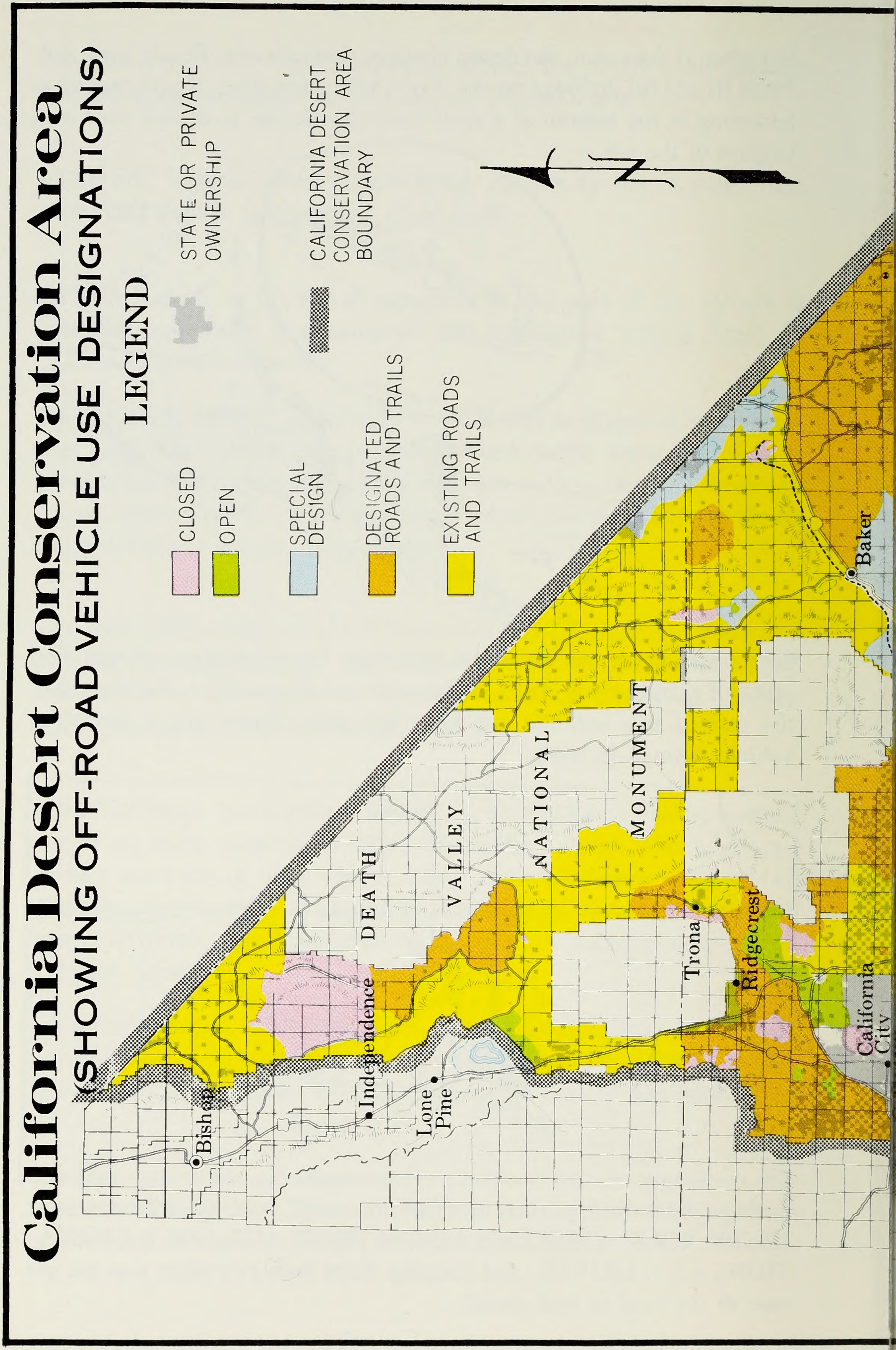
Besides man-made privileges and restrictions concerning desert off-road travel, here are some environmental factors that will affect your experience. It doesn't rain too often on the desert, as you well know, but when it does rain, the desert changes dramatically. Roads wash out. Flash floods fill drainage basins. For a very short time, if you happen to be sitting in the bottom of a wash you may decide to design your own version of the ark.



Soft sandy areas can be a real challenge for off-roaders. If you find yourself getting stuck often, let some air out of your tires. The increased tire surface area will add just that extra energy boost to get your tired vehicle through its trials.



Perhaps the most important bit of advice on off-roading in the desert is: KNOW YOUR VEHICLE'S LIMITATIONS AND YOUR LIMITATIONS AS A DRIVER, and consider them both everytime you are not sure of the road or trail ahead.

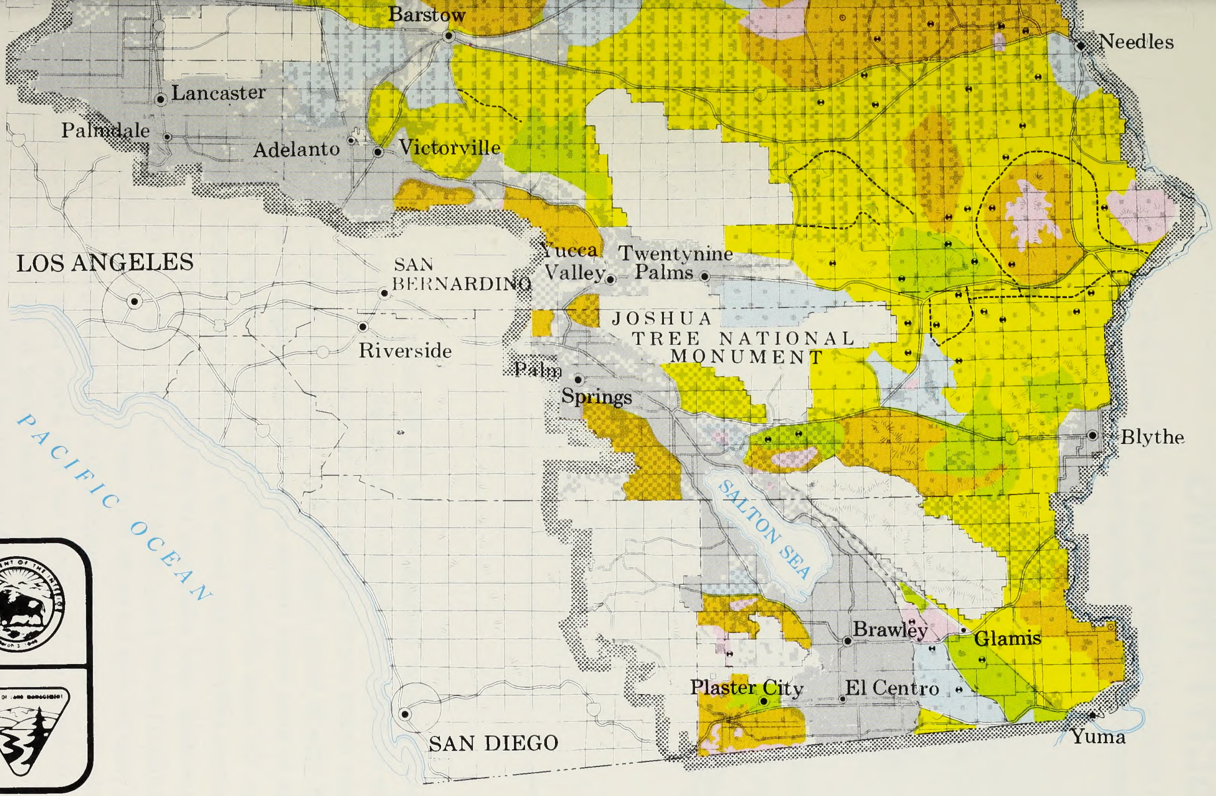


California Desert Conservation Area

(SHOWING OFF-ROAD VEHICLE USE DESIGNATIONS)

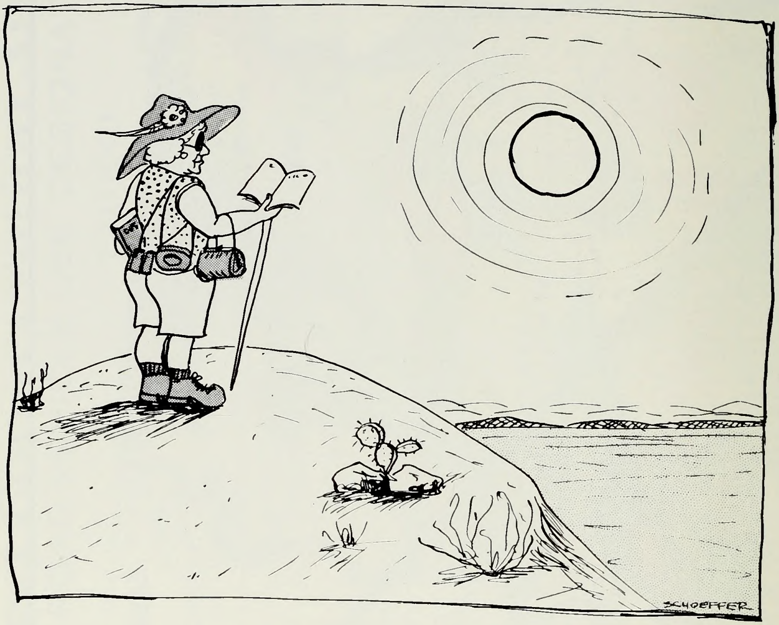
LEGEND
CLOSED
OPEN
SPECIAL DESIGN
DESIGNATED ROADS AND TRAILS
EXISTING ROADS AND TRAILS
STATE OR PRIVATE OWNERSHIP
CALIFORNIA DESERT CONSERVATION AREA BOUNDARY
N
Bishop
Independence
Lone Pine
DEATH VALLEY NATIONAL MONUMENT
Trona
Ridgecrest
California City
Baker

DESERT USE DESIGNATIONS MAP



U. S. DEPT. OF THE INTERIOR BUREAU OF LAND MANAGEMENT 1977

DESERT HIKING



Contrary to popular opinion, hiking on the desert is not only for the hard-core outdoorsman. People of normal physical abilities will do just fine. Most desert users will spend at least some of their time hiking. Off-road vehicle users often use their vehicles to reach remote areas, then hike to even more remote areas. The advantages of desert hiking are many, the most obvious probably being habitat variety. If you want to see several different life zones in a relatively short distance, climb a desert mountain. And when you're on top, be sure to notice the mountains a hundred miles away (if it's a clear day) and trace the complex drainage patterns that carve the hills and valleys below you. When you sleep under the stars try to remember that even back in the city all these stars are in the sky. The desert air just keeps them polished a little better. If you're still not convinced that hiking in the desert might be worth a try, find an avid desert hiker and ask him/her about the desert. Just be sure you're not in a hurry.

For those of you who have decided to give it the old college try, here are a few tips that may help on your desert hiking adventure:

1. The desert has few trails but its natural terrain lends itself to walking. Stay on ridges or high ground as opposed to sand washes. Often washes are interspersed with rock "waterfalls".

2. Carry and use a map and compass.

3. Park your car on high ground. It will be easier to find when you return to it.

4. When half your water is gone, it's time to turn back.

5. Things you may need: mirror for signaling, whistle, compass, hat, sunglasses, adequate clothing for both sun protection and cold nights. Plus all the gear you need for "regular" hiking.

SURVIVAL TIPS

Whether by plan or mishap, anyone who frequents the desert may become stranded ''in the middle of nowhere'' and need to know how to survive. So . . .

1. Always be sure that someone knows where you are going and when you expect to return. If friends or neighbors don't know: leave word with the nearest ranger staff (addresses and phone numbers for BLM area offices are listed in the back of this booklet). Remember to notify the proper people when you come out of the desert.

2. It's a good practice to travel with more than one vehicle in case one breaks down.

3. If you are stranded in a car or near a fairly good road, stay there. A car or people on a road can be seen for miles on the desert.

4. Make a ground signal out of whatever you have. Anything bright works well. If you have nothing else, use rocks in a clearing.

5. Take a hint from the desert residents: remain inactive when it's hot. Stay in the shade and conserve energy. You'll lose less body water if you wear layered clothes instead of minimal clothes. The heavier layers will hold your perspiration rather than give it up to the dry desert air.

6. If you must travel, travel when it's cool. Mark your path with stones, notes, or whatever you can. If you leave notes, include the date, time, and direction of travel.

CODE OF ENVIRONMENTAL ETHICS

For Drivers of Off-Road Vehicles

I will appreciate the solitude and beauty of our natural environment, and respect the feelings of others toward it.

I will ask myself, each day out of doors, what values of nature attracted me there, and do all I can to preserve those values.

I will not drive where I cannot leave the land essentially the same as before I drove across it. If it is fragile enough to show vehicle scars, it is too fragile for travel by vehicles.

I will always gear down to prevent wheel-spin on wet or soft ground.

Wherever possible I will travel by established roads and vehicular trails.

I will leave no litter — not a bottle cap, can tab, gum wrapper or film tab. I will carry out what I carried in, and if possible more.

Because noise is alien to wilderness, I will equip my vehicle with the most effective muffler and will urge that manufacturers improve this feature.

I will not drive my vehicle in any area posted against such use. I will observe the laws and regulations of every public authority, and report all violations of such rules.

I will not drive near to, or chase, or disturb any animals, wild or domestic.

I will not drive on private property or carry firearms there without the owner's permission. I will not damage fences, and will close all gates.

I will keep my vehicle in good mechanical condition, for safety's sake and to prevent excessive exhaust fumes and oil leaks.

If I wish to race up steep slopes or over rough terrain for sport, I will be sportsman enough to do so only in those places designated for such use.

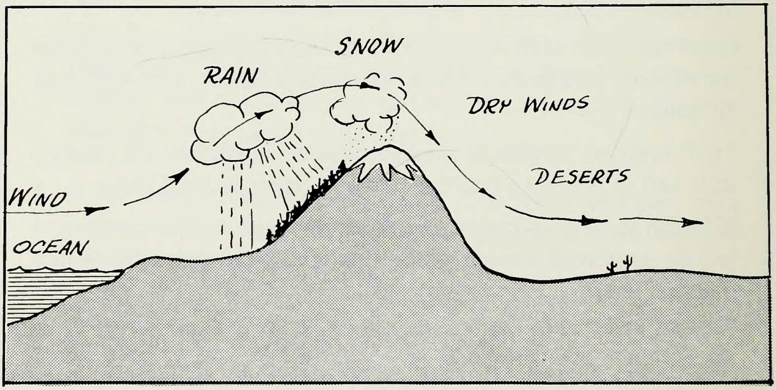
Developed by Jeep Corporation in co-operation with members of the Outdoor Writers Association of America.

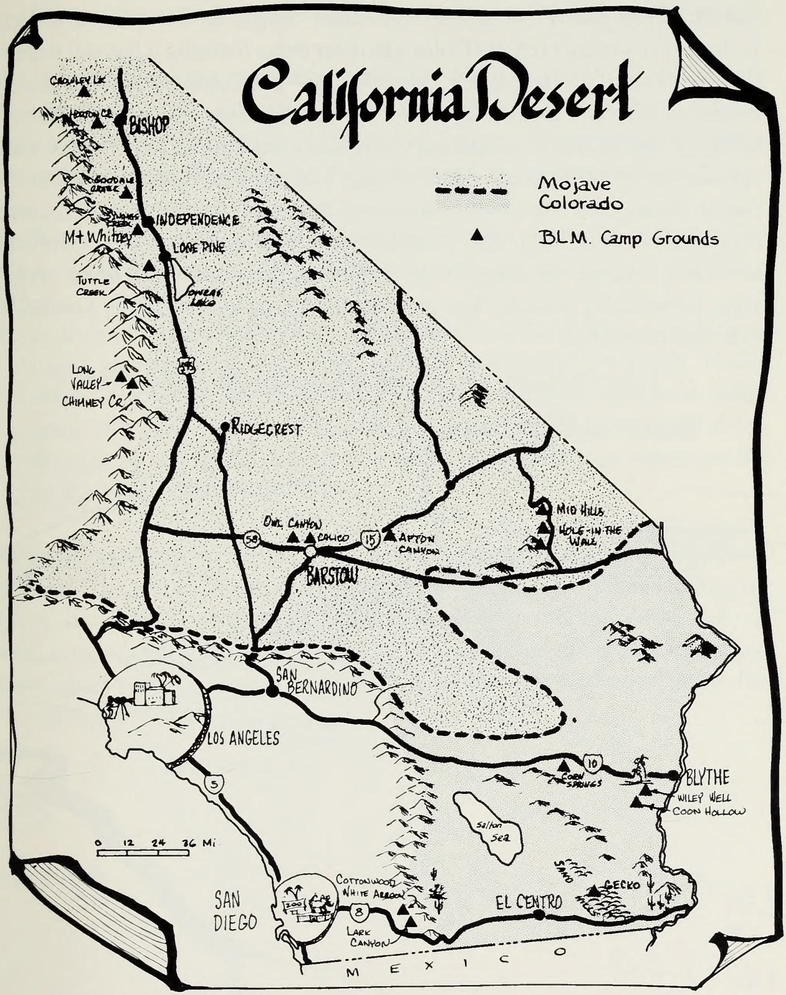
DESERT AWARENESS

The two basic features which make an area a desert are lack of rainfall and frequent drying winds which contribute to further lack of moisture. In California our deserts are largely the result of the rain shadow effect of the mountains. Winds from the ocean collect moisture. As these winds move east they are uplifted when they reach the mountains. The moisture from the ocean rises and becomes cooler and more dense. The heavier moisture falls and accounts for the rainfall and snowfall that occur west of and on the mountains in California, and for the lack of moisture available east of the mountains. This rain shadow effect can be seen most abruptly when driving across the Sierra Nevada mountains. The west slope habitat shows the effect of moderate to abundant rainfall while the east slope is arid with comparatively sparse vegetative covering.

The two major types of desert in the California Desert Conservation Area are: 1) the Colorado portion of the Sonoran desert (low desert), and 2) the Mojave desert (high desert).

The Colorado desert is the low, hot desert; land of creosote, smoketree, Palo Verde, ocotillo, and teddybear cholla cactus (See desert plant list for latin names.)

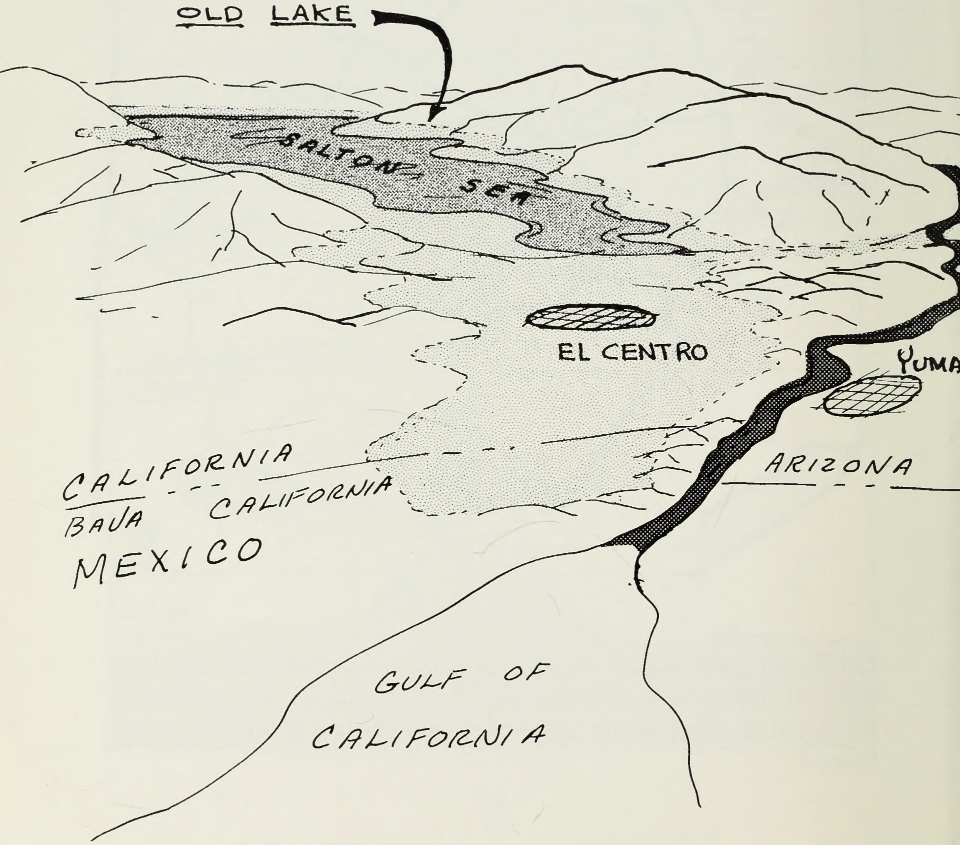




This desert got its name from the fact that it is bounded by the Colorado River. Its history is closely linked to the history of the lower Colorado River and its effect on the Salton Sink in which the Salton Sea is now located.

The Salton Sink was formed by the gradual sinking of the earth's crust when the mountain ranges to the east and west were being elevated. This earth movement was related to the fault system (which includes the San Andreas fault) extending the entire length of the 200-mile-long valley. If it weren't for the Colorado river delta forming a natural dam at the south end of the valley, the Gulf of California would probably extend at least as far north as Indio. Before flooding was controlled by a series of dams, the river occasionally changed course at its lower end, sometimes draining south into the Gulf and at other times north into the Salton Sink. One especially large lake that was created in this manner extended north of Indio and 17 miles south of the present U.S.-Mexican boundary. Along the edge of the valley and in some high areas which were historically islands, this old beach line, as well as many seashells, can still be seen.

Lake Cahuilla which used to occupy the Salton Sink



Some of the features which distinguish the Colorado desert from the Mojave desert are:

1. Frost is a rare occurrence on the low desert so several frost-sensitive plants (smoketree, iron wood) grow only on the Colorado desert.
2. In addition to the rainshadow weather feature typical of all California deserts, the Colorado desert has the effect of tropical storms which move up from the Gulf of California. This tropical influence is repsonsible for many of the low desert's summer storms.
3. Plants characteristic of the Colorado desert include: California fan palm, smoketree, ironwood, ocotillo cactus, palo verde, and jojoba.
4. A common indicator of the Mojave desert is the Joshua tree (growing at elevations of from 3500 to 6000 feet above sea level). Many areas in the Mojave desert have uncommon plants unique to those areas. If you frequent the Mojave you may want to learn more about the specific plant life at your favorite visiting sites (see reference list in the back of this booklet).

Keep in mind that we are the ones trying to distinguish between the two deserts. The actual boundaries are difficult to establish. There are many areas that seem to overlap and about which even the specialists have a hard time agreeing. But one advantage of classification is that it teaches us to observe more closely, and so to develop a greater appreciation for the intricacies of life.

Colorado desert,
Ocotillo in bloom

Colorado desert Cacti

Colorado desert,
Fan Palms at Corn Springs

Mojave desert,
Joshua Tree woodland

DESERT PLANTS: HOW DO THEY SURVIVE?

There are basically two categories of plants on the desert with two different survival strategies. They are annuals and perennials.

Annuals are plants that complete their life cycle within a year, from seed to plant to flower and back to seed. Desert annuals are the beautiful short-lived plants that carpet the desert during years of adequate rain. Most of the year their seeds lie dormant waiting for conditions which increase survival chances. Then, when everything is right, they burst forth with a color spectacle that is nothing short of magic!

Flowering desert annuals

How do seeds know when conditions are right? Some of them wait for years. They are tiny living capsules in hibernation; using only the slightest seed energy to maintain life; saving the rest for their brief moment of plant, flower, and the next seed. The complex factors that tell the seed when it's time to germinate include an interaction between rainfall, warmth, and competition with other plants. Seeds of many annuals require a drenching of more than ½ inch of rainfall to wash chemical inhibitors from the seeds or to leach germination inhibiting salts from the soils. This relatively large amount of rainfall helps insure enough moisture for the survival of the seedlings.

Besides rainfall, temperature also effects the germination of desert annuals, especially in areas having both summer and winter rains. Winter annuals germinate and grow during the winter, then flower in the spring when the days are long enough to signal the end of the cool wet winter season. In contrast, summer annuals germinate after summer rains and flower during summer months. Temperature, rather than day length as in the case of winter annuals, determines both germination and flowering of summer annuals. As soon as these plants reach a suitable size, they will flower.

Perennials are plants that have a life cycle which extends longer than a year, i.e., the plants that are present all year, and that have extended life spans. These plants have extensive and/or deep root systems that enable them to tap underground sources of water and to gather water from large areas. In addition, the seeds of many of these plants will not germinate unless they are drenched with rain water and scratched by flashflood action of sand and gravel in a wash. This assures that unless the storm is big enough to soak the ground thoroughly, the seeds will remain dormant. When sufficient water is available to cause the seeds to sprout, the seedlings put most of their energy into an extensive root system so they can begin to tap ground water sources.

Ironwood, a desert perennial

An interesting survival trait of desert perennials is that the plants in a small area often establish their root systems at different depths so they don't compete for ground water.

Cactus plants, by having fleshy stems and leaves, are able to store water for long periods of time. When it rains they fill themselves with water and then ration its use during hot dry spells. This accounts for their ability to grow in harsh environments such as rocky ledges.

Other survival mechanisms of desert plants include: the ability to take water from soil when there's very little water to be taken, a heavy waxy cuticle on the leaves and stems which reduces water loss from plant tissues, dense mats of hairs on leaves and stems, leaves oriented so they don't receive direct sunlight, grey color to minimize heating, and leaves curling or dropping during drought periods to reduce surface area from which water loss may occur. In addition plants may lower their metabolism, barely surviving until the next wet period. Many desert shrubs have the ability to live through extreme water loss. Of course, individual plants will show only some of these mechanisms. And there are many not listed here. Look closely when you visit the desert and try to discover how plants are able to survive in extreme temperatures with very little water.

DESERT PLANT COMMUNITIES

The most widespread desert plant community is the CREOSOTE BUSH SCRUB. It dominates the landscape below 3,500 ft. elevation, areas where annual rainfall is generally from 2 to 8 inches. Plants of this community, in addition to the Creosote Bush, include Burro Weed, the tall, colorful, spiny Ocotillo, Brittle Bush, Cheese Bush, and prickly pears and cholla cacti.

A plant community occurring within the Creosote Bush Scrub which could be considered as a separate community is the sand wash association. The plants in this area have very deep, wide root systems that take advantage of the available water. This plant association is often very colorful, especially when in flower, and deserves careful observation to appreciate its beautiful subtleties. Characteristic sand wash plants include: the green-barked Palo Verde which has chlorophyll in its bark, the stately smoke tree, the grabby Catclaw, the beautiful Desert Willow, Chuparosa, a favorite nesting site for hummingbirds, and Desert Lavender, which often attracts bees to its fragrant blossoms.

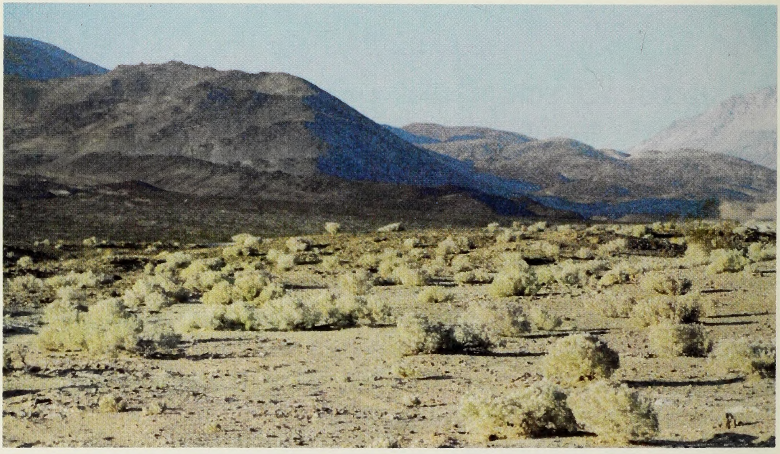
The SHADSCALE SCRUB plant community is characterized by small shrubs (usually less than half a meter tall) which are generally grayish, small-leaved, many-branched, sometimes spiny, and produce small flowers. It occurs in very heavy alkaline or saline soils, often underlain with a hardpan in areas of less than 7 inches of rain per year. Mojave Desert mesas and flatlands at elevations of 3,000 to 6,000 feet are likely sites for Shadscale Scrub. Shadscale, for which this community is named, is an erect, rigidly branched, spiny shrub with rather crowded, round leaves that look like fish scales, and in many areas, doesn't even occur in its community namesake. Other plants in Shadscale Scrub are Hopsage, Winter-fat, Spiny Sagebrush, Matchweed, Cheese Bush, Blackbush, and Mormon tea.

Creosote

Creosote bush scrub

Sandwash Association (above)

Shadscale Scrub (below)

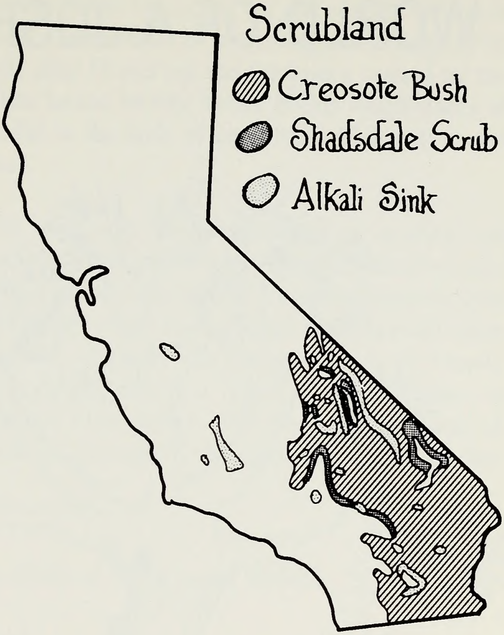


In low-lying, poorly drained alkali flats and playas, such as those in the Panamint and Death Valleys, a plant community called ALKALI SINK SCRUB occurs. It is made up of halophytic (salt-tolerant) plants which characteristically have fleshy leaves and stems. Common species include: Saltbush, Iodine Bush, Pickleweed, greasewood, and seep weed. Rainfall in areas where Alkali Sink Scrub occurs may be as low as 2 inches per year or less, but the soil is often saturated with saline water due to seepage into these low areas. This frequent collection and evaporation of water may result in the formation of a hard saline surface crust when the soil is dry. Because of this, an interesting relationship has developed between the local ant species and the Alkali Sink plants. In the process of collecting and storing seeds, the ants carry the seeds below the hard surface crust to a level where the salinity is lower and the moisture conditions are more favorable for seed germination. Subsequently, the seeds not used as food for the ants have a much better chance of surviving to become new plants.

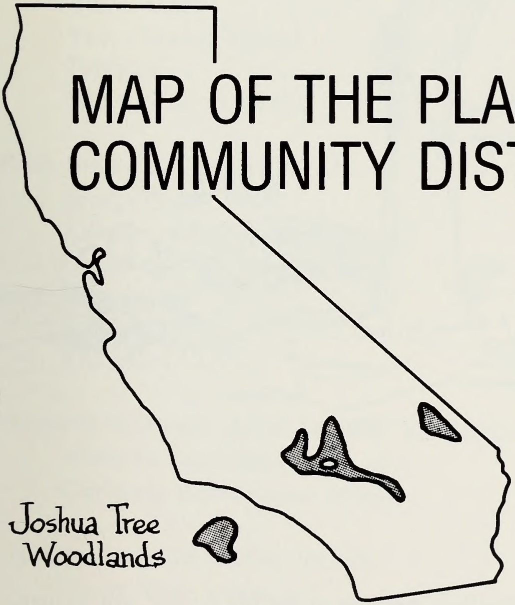
Alkali sink scrub, cinder cone in background

JOSHUA TREE WOODLAND is the name of the plant community which occupies the well-drained mesas and slopes of the Mojave desert at elevations of from 2,000 to 6,000 feet. Average annual rainfall varies from 6 to 15 inches. In addition to the handsome Joshua Tree, common associates of this community are Mojave Yucca, junipers, Mormon tea, cotton thorn, California Buckwheat, Bladder Sage, Box Thorn, and many species of cactus. Most of the woody plant species which are part of this community occur in other areas. Following a wet winter, you may be lucky enough to witness a spectacular show of the flowering annuals carpeting the desert under the larger woody perennials of Joshua Tree Woodland.

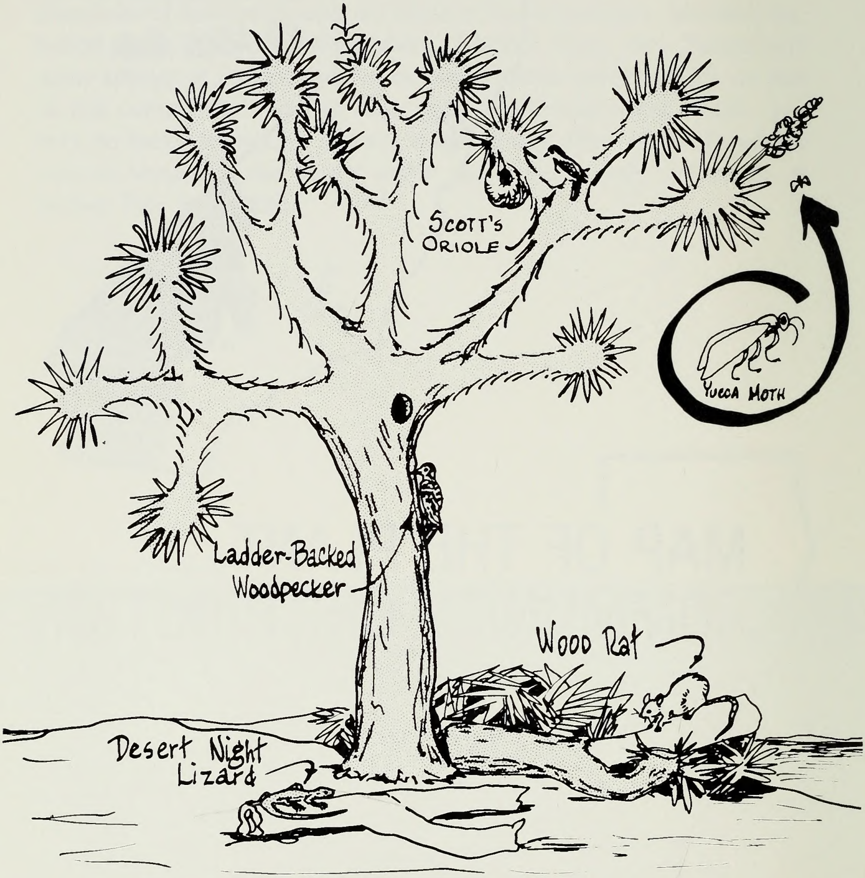
Joshua tree woodland



MAP OF THE PLANT COMMUNITY DISTRIBUTION



WORLD OF A JOSHUA TREE



About the Joshua Tree:

This picturesque tree, actually a member of the lily family, got its name from early Mormon settlers who were inspired by its aged, bearded appearance and uplifted arms.

Young Joshua trees are unbranched until they are old enough to flower when about 8 to 10 feet tall. Two causes of branching are thought to be the dying of terminal buds after flowering and the injury caused by the Yucca Boring Weevil. The larvae of this beetle builds tough cases of chewed-up, fibrous material in the ends of branches which may cause the plant to branch further.

Joshua trees reproduce in two ways: from seeds and by sending out long, underground runners. The Navaho Yucca Borer (a butterfly) lays her eggs only on the young plants that spring from the runners. Her larvae, when hatched bore their way to the large underground stem where they have an abundance of food. It is not know how the female butterfly can distinguish between the two types of young plants, a distinction which man cannot easily make. But because the plants of runner origin are alone suited to her needs, she apparently never lays her eggs on seedlings.

Insects (many eat pollen, fruit, or wood pulp) include:

- Yucca Moth
- Yucca Boring Weevil
- Termites
- Many kinds of beetles

Birds (many eat insects) include:

- Scott's Oriole
- Ash-throated Flycatcher
- Ladder-backed Woodpecker
- House Wren
- Sparrow Hawk
- Red-tailed Hawk

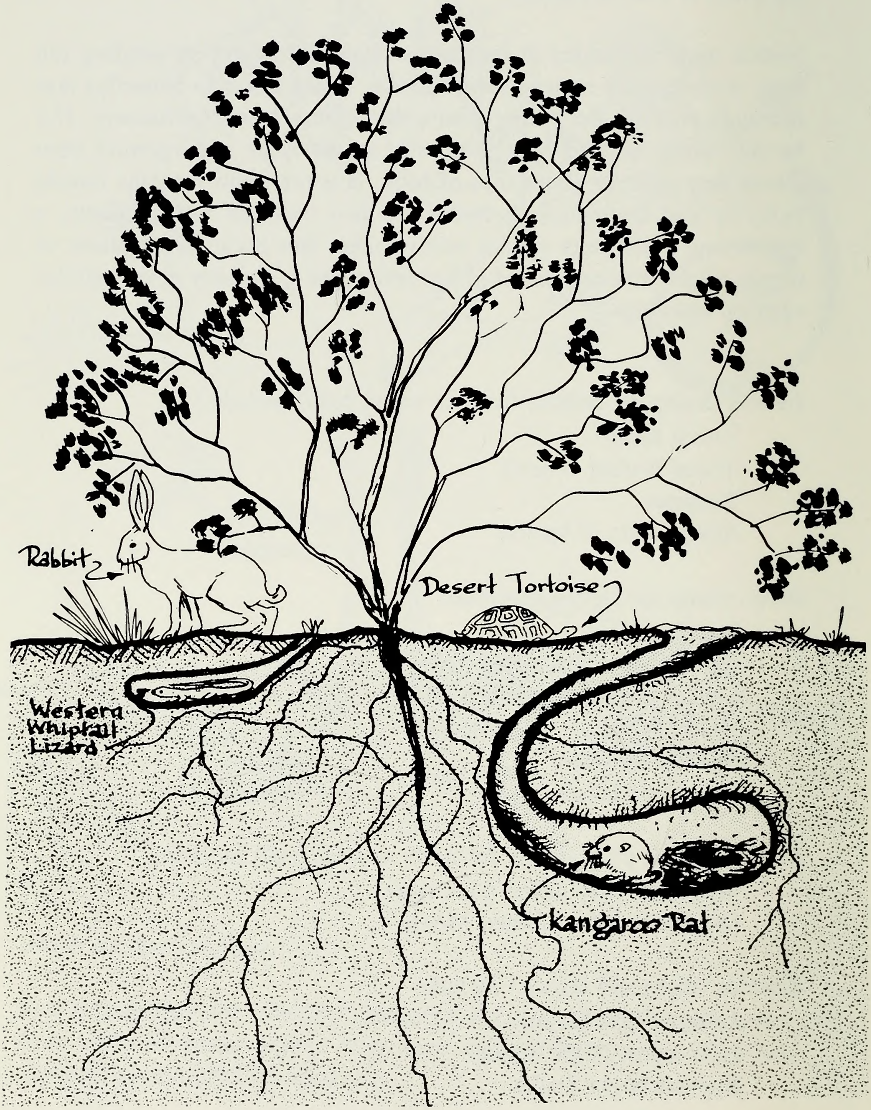
Mammals (use plant debris for nests and eat fruit) include:

- Wood rat (also called pack rats)
- California White-footed Mouse

Reptiles (many eat insects) include:

- Desert Night Lizard
- Leaf-nosed Night Snake
- Spotted Night Snake

The Creosote Bush: A Micro-Environment



About the Creosote Bush:

One of the longest lived and most abundant desert shrubs, the creosote bush, creates food, shelter, and climates (a micro environment) for many living things.

It is so well adapted to the desert that it can survive without rain for as long as three years.

The plant gets its name because of its resinous odor; it is not the source of the creosote used as wood preservative.

The creosote bush, like many desert plants, searches for water. Root depths and lengths vary. Sometimes roots grow only two feet deep until they reach an impervious layer of clay. Below the clay layer the soil is dry and of no use to the roots. Roots may extend horizontally for 50 feet or more to get moisture. In the porous soils of washes, the roots may grow more than 40 feet deep.

Animals living under the bush —

Animals live under a creosote bush for shade, food, and protection. Also the soil is less likely to have a crust under the bush than in between bushes. Its leaves and seeds mix with the soil to keep it loose and richer. Some animals burrow under the bush where it is easier to dig.

Mammals (many eat the seeds) include

kangaroo rat
pocket mouse
grasshopper mouse
rabbit
antelope ground squirrel
Mojave ground squirrel

Reptiles (most eat the insects on the creosote bush; some eat flowers and seeds) include:

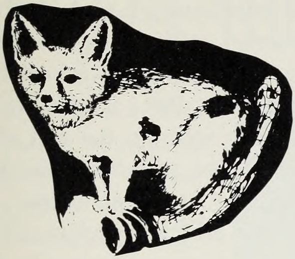
gecko
various snakes
desert tortoises
long tailed brush lizard
western whiptail lizard
leopard lizard
side blotched lizard

DESERT ANIMALS: HOW DO THEY SURVIVE?

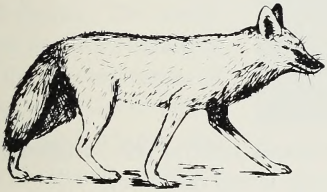
Animals have the same two problems that plants must deal with, extreme temperatures and little water. Like the plants, they have developed mechanisms to permit their survival. Among the most common survival techniques of desert animals is avoidance. Burrowing is common and by having a burrow which extends over several different depth levels, animals can regulate their temperature by moving up or down in their tunnel home. Many desert animals are inactive when it's hot, saving their energy for the cooler times of day when heating and water loss aren't such problems. Since water isn't readily available, diet is often the major source of water. Succulent plants, insects, and other animals are all used to supply both food and water. The light coloration of desert animals may help decrease heat absorption and maintain lower body temperatures. To avoid extreme temperatures (both hot and cold) and to enable survival when food supplies are low, some desert animals go through a period of dormancy in which little food is required to maintain life and body temperature is held fairly stable by burrowing or some other form of insulation.

Desert animals, during stress conditions, live on the brink of their energy reserves. Survival depends on their physiological and behavioral responses. When our presence further stresses them in any way, we are interfering with a very delicate balance.

A CLOSER LOOK

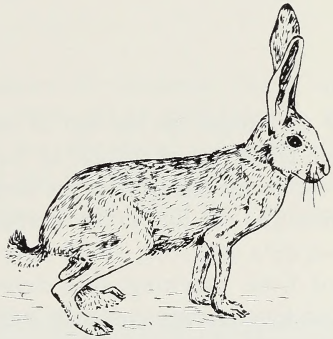


This beautiful buff-colored kit fox is only 20 inches long from nosetip to tail. If you watch the shadows at the edge of your camp very carefully, you may be lucky enough to see him.

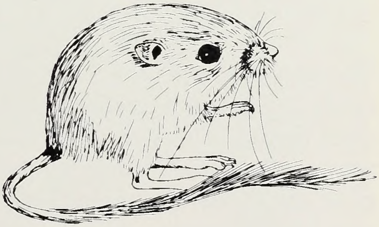


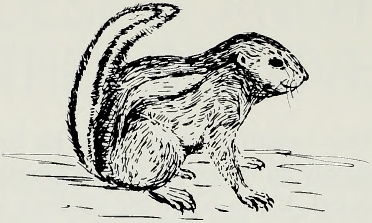
Coyotes look like lanky dogs trotting across the desert. Listen for their barking serenades after dusk or early in the morning just before dawn.

This black-tailed hare, also known as the desert jack-rabbit, can be seen leaping bushes and rocks when you happen to startle him in his home.

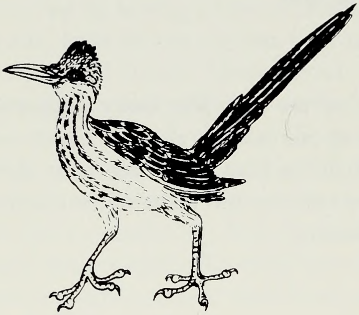


You will probably see this little Kangaroo Rat if you take a drive at night on the desert. He may be small but try to catch him and you'll learn just how fast this little guy can hop.





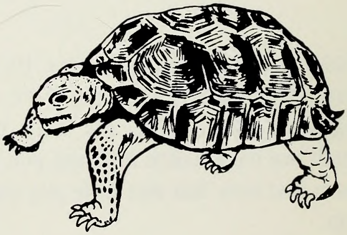
The antelope ground squirrel, sometimes called a chipmunk, does have white stripes on his back like a chipmunk. But a chipmunk's stripes go clear to the end of his nose and the stripes on our desert friend stop at his shoulders. You may also notice the white tail carried up like a banner when he runs.



It's a rare treat to see a roadrunner racing across the desert.

See the stripes on the tail of this zebra-tailed lizard. When he runs he curves his tail up over his back. Unless you see him in the morning when he's still cold, you'll have a hard time catching this desert speedster (he runs up to 18 miles per hour).

The desert tortoise, now fully protected in California, is the official state reptile. There is no certain way to tell a tortoise's age, but they grow very slowly and probably live more than 50 years.



GEOLOGY: THE MANY FACES OF THE DESERT

Panamint mountains, alluvial fans

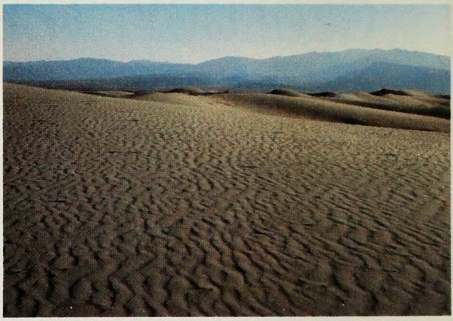
The California deserts are a far cry from broad flat look-alike vistas. Everywhere this dry land is broken by rugged mountains in a multitude of shapes, colors, and moods. The mountains are individualized by the carving forces of wind and water which form sand washes and leave broad sloping fans of sediment extending like hands from the rugged ridges.

Further variety is offered by the evidence of volcanoes. Black lava flows and the unique form of cinder cones are in abundance in the desert. Most of the cones are rather low and broad indicating that eruptions were short-lived but violent. Look for cinder cones isolated in broad basins or atop the mountain ranges as you travel the California deserts.

Cinder cone east of Baker

Dry lakes (playas) are common in undrained basins between mountains. During years of heavy rains these basins may fill with water forming temporary lakes, shallow but often extensive.

Eureka dunes –
creosote scrub in foreground


Wave patterns, saline dunes

Sand dunes are generally related either to old lake beaches or to permanent eddies in the wind system. Dunes offer incredible light effects and colors. Their uniqueness is expressed in sounds and moods, as well as in the types of plants and animals that are found on them. Exploring in the early morning the tracks of the previous night's activity is a learning experience no dune visitor should neglect. At dusk, when the wind blows across the dune ridges, you may hear the soft whistling that accounts for the descriptive title, singing dunes.

Dune crests

Tracks, saline dunes

DESERT SOILS

Soils are formed by a complex interaction between climate, original parent material, plants and animals, topography, and time. An important feature of many desert soils is their aggregation into erosion resistant units. Among these forms of aggregation are soil crusts, formed when rains wash in fine surface material, usually mixed with clay. The soil particles adhere to each other resulting in a strong, dense, relatively impermeable layer. This layer helps stabilize desert soils, decreasing wind erosion and dust problems.

Desert soil crust

Another interesting and important feature of desert soil is desert pavement. Desert pavement is a surface layer of stones which protects the softer sub-surface soils. It looks like a stone mosaic, its patterns varying with local topography and stone types. These stone pavements may contain fragments which are so close together that they have the appearance of a man-paved surface. Often the exposed stone surface is darkened by a dull black desert polish called "desert varnish", while the

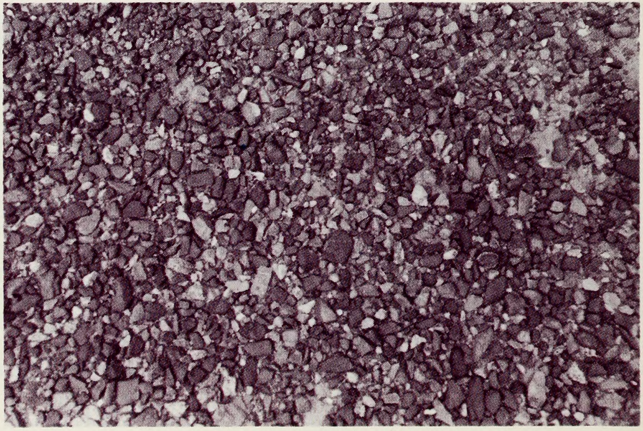
Desert pavement

undersurface has an orange-brown stain. Three processes may contribute to the formation of desert pavement.

1. Fine material is blown away by the wind leaving coarse soil material as a surface covering.
2. Water erosion removes fines.
3. There may be an upward migration of coarse soil particles caused by the alternate freezing/thawing or wetting/drying of desert soils.

Pavements are most common where surface particle concentration is uninhibited by vegetation and where fine and coarse materials occur together. Areas of pavement range from a few square yards to hundreds of acres in size.

Close-up: desert pavement



CULTURAL RESOURCES

Petroglyphs

Archaeological sites are among the most fragile environmental resources in the desert. The deserts provide a rich environment for prehistoric peoples. These populations, now vanished for the most part, have left their village sites, camps, and refuse dumps in the form of archaeological sites in the valleys, mountains, and on the hillsides of the deserts.

These sites are valuable for a number of reasons:

— They contain evidence of social and cultural changes that can be studied to find general laws about human behavior.

— They are the only record we have left to us of tens of thousands of years of human experience.

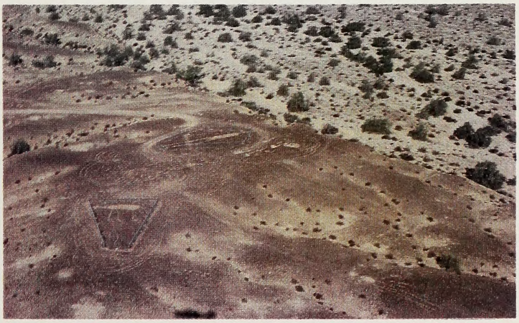
— They contain a record of environmental and geological changes.

— They contain cemeteries and other places of religious significance to the native people of North America.

— They provide excellent opportunities for education at all levels.

In addition to remnants of prehistoric populations, the deserts house a variety of cultural resources that help record our history. Included are: mining claims and sites, old trails, railroads, towns, and homesteads.

In spite of protective laws, and the work of professional archaeologists, cultural resource sites continue to be destroyed, mainly by vandalism, at a very rapid rate. Since these resources are *non-renewable* their depletion is a matter of serious concern.



Intaglios

And what about taking care of the desert? An activity I have used when trying to increase awareness of change has helped me to keep in mind the effect I have on the world. It has been a reminder that I am connected to the world and to survive, I must take care of it.

Joshua tree, Redrock Canyon

Attitudes toward change (family or group activity)

1. Form 2 groups.
2. Have one group note evidences of change in the area which have been caused by humans.
3. Have the other group note evidences of natural change which has occurred in the area.
4. Have both groups come together and discuss their findings in terms of positive, negative, or neutral aspects of and reactions to each change.
5. Now, DISCUSS THE CHANGES FROM THE POINT OF VIEW OF ANIMALS OR A MOUNTAIN.

The last activity is the clincher. Whenever you make a change, remember the local residents and ask yourself if you're affecting their home.

Common skipper, tamarisk blossom

EPILOGUE

The desert is a complex, fragile land. It has definite dangers and takes its toll when we don't accord it proper respect. But it offers compensations; broad vistas, ecosystems to explore, room to play and grow, and silence for listening to the heartbeat of the world. As long as we conform our needs to the preservation of a balanced life system, the desert will continue to be a land for exploring, learning, and remembering values we forget in the rush of the business of life.

This land belongs to my people.
Some of them are dead.
Some of them are living.
But most of them have not yet been born.

DESERT PLANTS

According to Munz, *A Flora of Southern California,* 1974.

Common Name	*Latin Name*
Basin Sagebrush	*Artemesia tridentata*
Blackbush	*Colegyne ramosissima*
Bladder Sage	*Salazaria mexicana*
Beavertail Cactus	*Opuntia basilaris*
Brittle Bush	*Encelia farinosa*
Burro Weed, Bur Sage	*Franseria dumosa*
California Buckwheat	*Eriogonum fasciculatium*
California Fan Palm	*Washingtonia filifera*
Catclaw	*Acacia greggii*
Cheese Bush	*Hymenoclea salsola*
Cholla	*Opuntia acanthocarpa*
Chuparosa	*Beloperone californica*
Creosote	*Larrea divaricata*
Desert Lavender	*Hyptis emori*
Desert Willow	*Chilopsis linearis*
Greasewood	*Sarcobatus vermiculatus*
Hopsage	*Grayia spinosa*
Iodine Bush	*Allenrolfea occidentalis*
Ironwood	*Olneya tesota*
Jojoba	*Simmondsia chinensis*
Joshua Tree	*Yucca brevifolia*
Jumping Cholla	*Opuntia bigelovii*
Matchweed	*Gutierrezia* spp.
Mojave Yucca	*Yucca schidigera*
Mormon Tea	*Ephedra* spp.
Ocotillo	*Fouguieria splendens*
Old Man Prickly Pear	*Opuntia erinacea*
Palo Verde	*Cercidium floridum*
Pickleweed	*Salicornia* spp.
Saltbush	*Atriplex* spp.
Seepweed	*Svaeda* spp.
Shadscale	*Atriplex confertifolia*
Silver Cholla, Golden Cholla	*Opuntia echinocarpa*
Smoketree	*Dalea spinosa*
Spiny Sagebrush	*Artemisia spinescens*
Winter Fat	*Eurotia lanata*

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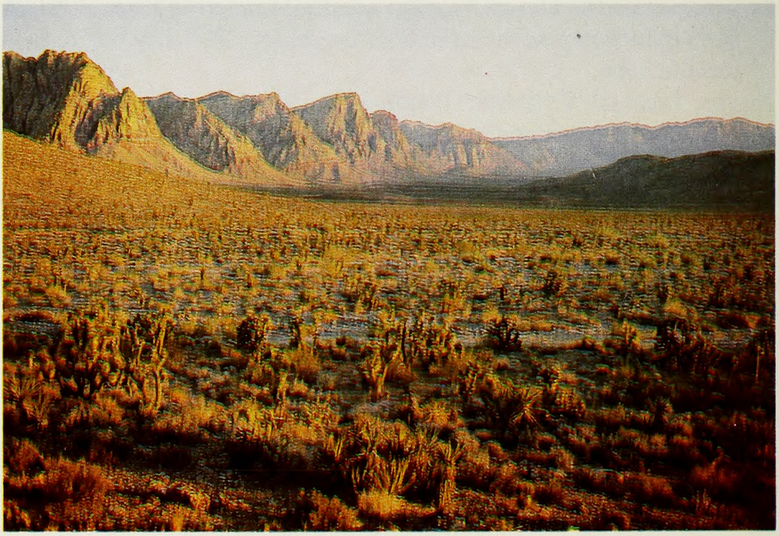
Strong, Mary F. *Desert Gem Trails*. Gembooks, 1966. Good field guide for rockhounds. Specifically covers rockhounding sites in the California deserts.

Spring Mountain



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UNITED STATES DEPARTMENT OF THE INTERIOR

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

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NOTES

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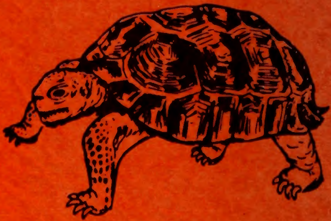

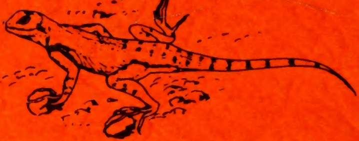

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